

Utilization of Milankovitch Cyclicity To Understand the Stratigraphic Evolution of the Late Neogene California Margin, Santa Maria Basin

By

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This study will investigate the use of Milankovitch cyclicity in the late Miocene-early Pliocene sedimentary record of the Central California Margin as a tool to provide high-resolution chronological dating and correlation in order to better understand the three-dimensional evolution of the Santa Maria Basin. Changes in the global distribution of solar radiation due to past orbital cyclicity have had profound effects upon the circulation of the atmosphere and the oceans and upon the climate of the planet. These changes are recorded in hemipelagic sediments by modulation of rates of coastal upwelling and terrigenous runoff. If sedimentary cycles in the late Neogene Monterey and Sisquoc Formations (and their equivalents) can be unequivocally demonstrated to be due to orbital cycles, then they can also be used to date and correlate these otherwise hard-to-date fine-grained sediments at a very fine scale.

We have already demonstrated Milankovitch cyclicity down to specific 100,000-year cycles at a superbly dated Ocean Drilling Program core (ODP Site 1016) and will try to tie cycles at this site to more proximal offshore petroleum wells (federal and state waters) and oil well and outcrop data from onshore locations. The well log analysis and correlation will be primarily based on gamma ray logs. A correlative onshore outcrop will be analyzed sedimentologically, geochemically, biostratigraphically, and potentially with a hand-held gamma ray detector to refine our understanding and interpretation of the well logs.